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Subj: Recipe for setting collaring "shim" thickness

The target coil prestress is 10 kpsi. In the current design of the collars, this state should be achieved with the collar cavity 7.4 mils larger (in vertical radius) than the design size. This is the sum of a 5.4 mil deflection of the collars due to the prestress and a 2 mil design vertical ovality. To achieve this state the coils should be molded so that on the average they are 7.4 mils oversize at 10 kpsi. (This average runs over all coils as well as all measured positions within a coil.) The mold cavity size will be iterated until the average coil size is correct. If the mold size is incorrect so that the average coil size is too small, then the coil package should be built to the correct size by adding kapton at the pole. The thickness of kapton should be set by the average size of all coils molded under the same conditions, not by the size of each individual coil. The average, of course, runs separately over inner and outer coils.

Short magnets DS0307 and DS0308, when collared with collar "shims" chosen according to this recipe, had prestresses about 6 kpsi lower than expected. Also, DS0308 has a body field sextupole moment of -6 units. Both of these experimental facts can be accounted for by assuming that the collar cavity is 7 mils per quadrant too large in both the inner and outer coil. The reasons for this are not yet understood. Nonetheless, we must add material (collaring shims) to reduce the azimuthal size of the cavity in which the coils reside. The total collaring "shim" thickness is the sum of that amount needed to bring the average coil size up to 7.4 mils oversize at 10 kpsi plus 7 mils more.